

relativus, but is very distinct from that species in size and other characters.

Agallia bigeloviae, n. sp.—Form and color, nearly, of a small, pale *A. sanguinolenta*. The female differs only as follows.

More robust. Sculpturing on posterior three-fourths of pronotum not nearly so coarse. Veins in elytra more prominently brown. Two medial brown dashes on pronotum and vertex. Black spots on vertex larger. Elytra barely equalling abdomen. Hind margin of last ventral segment thrice strongly notched, the middle notch very deep

and much more obtuse at apex than the lateral, the two lobes thus formed obtusely rounded at tips and much shorter than the hind angles of the segment. Length little more than 2 mm.

Described from a single female taken on Bigelovia at Albuquerque (Ckll., 4616). This species is very nearly related to *A. sanguinolenta*, but easily separated by the above mentioned characters, especially the form of the last ventral segment. A larger series of this insect is much needed for study.

XIII. NEW SPECIES OF PROSAPIS.

BY T. D. A. COCKERELL.

The name *Prosopis* is preoccupied for a genus of plants, on the flowers of which the bees of the genus *Prosopis* are sometimes found. I have therefore ventured to write the bee-genus *Prosopis* ($\pi\rho\sigma\text{-}\alpha\pi\iota\varsigma$), a name which accords with the assumed fact that it is one of the most primitive among bees.

Prosopis bakeri, n. sp.—♂, length 5 mm., black, with creamy markings, punctures of head and thorax fine and close. Head rather broad; face not much narrowed below, white below level of antennae, the white extending as a pointed projection upwards in median line, and on each side as a club-shaped process, curved over the antennal socket, and remote from the orbital margin. The two sides of the median pointed process meet at an angle of almost 45°. Flagellum very dark brown, paler beneath. Scape swollen, truncate, its anterior side white and posterior side black. Prothorax all dark, except the usual creamy-white spot on tubercles, which presents no dark dot. Tegulae with a yellow spot. Pubescence all pale. Pleura rather hairy, closely and rather coarsely but not very deeply punctured. Dorsal wrinkles of metathorax rather feeble. Wings grayish-

hyaline, nervures and stigma piceous. Second submarginal narrowed one-half to marginal. Femora black; tarsi yellowish-white with the ends darkened; anterior tibiae yellowish-white in front; middle tibiae with the basal fourth, and hind tibiae with the basal two-fifths yellowish-white. Abdomen moderately shining, very minutely punctured, slightly pubescent at sides, but without any conspicuous hair-bands or patches.

Hab.—Colorado; seven miles W. of Livermore, Larimer Co., July 1, 1894, 7000 feet (C. F. Baker).

Allied to *rudbeckiae*, but differs by the white face, the half white scape, and the white frontal process curving over the antennae, etc.

Prosopis wootoni, n. sp.—♂ about 5½ mm. long, black with pale dull yellow markings, head and thorax closely punctured. Pubescence pale, including that of dorsum of mesothorax. Head rather large and broad, face moderately narrowed below. Antennae entirely piceous, scape only moderately swollen. Face below antennae pale yellow, the yellow forming only a rounded projection in the median line, but at the sides produced upwards

along the orbital margins more than half as far as the length of the scape, gradually narrowing from the base to a rounded termination which recedes a little from the orbit. Clypeus with a small black spot on each lateral margin. Prothorax with the usual yellow on tubercles, not showing any dark dot; and on the hind margin two very small and narrow, hardly noticeable, yellow lines. Tegulae wholly dark. Pleura densely and subconfluently punctured; base of metathorax rugose, with very large shining punctures. Wings hyaline, second submarginal cell not narrowed one-half to marginal. Femora black; tibiae black, anterior tibiae yellow in front, middle tibiae yellow at extreme base, hind tibiae with the basal two-fifths yellow. Tarsi with the first joint yellowish-white, the rest dark brown, except the anterior tarsi which are wholly dark brown. Abdomen shining, first segment finely punctured.

Hab.—New Mexico; Ruidoso Creek, 7500 feet on *Scrophularia*. July 6, 1895 (E. O. Wooton, 78)

Differs from *affinis* by the clear wings, more produced lateral face-marks, etc.; from *rugosulus* by the lateral face-marks terminating more narrowly, and not notched within; from *citrinifrons* also by the shape of the face-marks.

Prosapis citrinifrons, n. sp.—♂ about 5 mm. long, shiny, black with bright lemon yellow markings, head and thorax densely punctured. Pubescence of pleura pale, that of dorsum of mesothorax blackish. Head of ordinary size, face very little narrowed below, antennae black, scape little dilated; face below antennae bright yellow, the yellow in the median line forming a short broad narrowly truncate prominence, that at the sides extending upwards along the orbital margin rather more than half the length of the scape, broadly rounded-excavated within by the antennal socket, terminating narrowly and obtusely, at the tip slightly receding from the orbital margin.

Prothorax dark, except the yellow on tubercles, which shows a hyaline spot. Tegulae entirely dark. Base of metathorax strongly rugose. Wings smoky. Femora black; tibiae black, anterior tibiae orange in front, middle tibiae yellow at extreme base, hind tibiae with the basal two-fifths yellow. Tarsi dark brown, first joint of mid and hind tarsi yellowish-white. Abdomen shining, with sparse pubescence; first segment with minute scattered punctures.

Hab.—Colorado: Forrester's Ranch on Laramie River, Larimer Co., July 19, 1895, at 8500 feet (C. F. Baker).

Differs from *affinis* by the dark hind border of prothorax, and the shape of the face-marks; from *rugosulus* by the shape of the face-marks, etc.

Prosapis tridentulus, n. sp.—♂ about 5 mm. long, black with orange markings, head and thorax closely punctured, scutellum with the punctures deep but sparse. Head of ordinary size, face tolerably narrowed below, vertex closely but hardly confluent punctured, antennae wholly dark, scape stout. Face below antennae reddish-orange (perhaps yellow, altered by cyanide). Supra-clypeal pale patch conical, elongated, truncate, about two-thirds as long as the clypeus; lateral upward pale extensions narrow, rapidly receding from orbital margins, so as to be convex outwardly and concave inwardly, extending upwards very little further than the median mark.

Prothorax wholly black except the usual light patch on tubercles, which presents a black dot. Tegulae with a light spot. Punctures on pleura rather sparse. Base of metathorax rugose-tuberculate. Wings clear with a slight smoky tinge; second submarginal cell very broad, little narrowed above. Femora black with a light spot at extreme tip; tibiae black, anterior tibiae orange in front, middle tibiae orange at apex and base, hind tibiae with basal two-fifths and extreme tip orange.

Abdomen distinctly punctured, but first segment shining, with the punctures sparse, lateral hind margin of first segment with a narrow hair-band.

Hab.—Colorado; Chamber's Lake, Larimer Co., July 18, 1895, 9500 feet (C. F. Baker). Also from New Mexico; Ruidoso Creek, 7500 feet, July 6, 1895, on *Scrophularia* (E. O. Wooton, 75). Differs from *tridens* by its smaller size, clearer wings, second submarginal cell broader in proportion to its length, tubercles with a black dot, and less deeply punctured first segment of abdomen; from *verticalis* by the first recurrent nervure entering the second submarginal cell, and the shorter antennae; from *mesillae* by its larger size, longer and narrowed lateral face-marks, etc.; from *pygmaea* by its larger size, the face-marks, etc.; from *digitatus* by the clearer wings, and the curved, instead of straight, lateral face-marks.

Prosapis rugosulus, n. sp.—♂ about 6 mm. long, black with orange markings, head and thorax strongly punctured, scutellum with the punctures larger and sparser than those of the mesothorax. Head of ordinary size, face only moderately narrowed below, vertex confluent punctured, antennae wholly dark, scape stout. Face below antennae reddish-orange (perhaps yellow, altered by cyanide), median projection short, broad, truncate; lateral extensions of the pale color rather broad, somewhat excavated by the antennal sockets, ending, about on a level with the middle of the scape in a broad truncation.

Prothorax with a couple of small orange spots on hind border; tubercles largely orange, with no black spot. Tegulae with a small light spot. Pleura rather closely punctured. Base of metathorax rugose. Wings grayish hyaline. Femora black. Tibiae black, anterior tibiae orange in front, middle tibiae with a little orange at apex and base, hind tibiae with the basal two-fifths orange. First segment of abdomen

distinctly and rather closely punctured, first three segments with narrow lateral apical hair bands.

Hab.—Colorado; Chamber's Lake, Larimer Co., July 18, 1895, 9500 feet (C. F. Baker).

Var. *fallax*, v. nov. ♂. Tegulae with no light spot; no light spots on hind border of prothorax; lateral face-marks at ends curved inwards, receding a little from the orbital margin.

Hab.—Colorado; same locality and date as type (Baker). Another form, perhaps a distinct species, differs by the pale markings being yellow, the puncturing of mesothorax finer, and the scutellum more closely punctured. It is from Steamboat Springs, Colo., 6000 feet (Baker).

Prosapis tridens, n. sp.—♂ 6 mm. long, black with reddish-yellow markings. Head, thorax and abdomen strongly punctured. Head of ordinary size, face only moderately narrowed below. Face below antennal sockets reddish-yellow, the clypeal sutures dark; the light color extends upwards in the median line as a conical projection, truncate about the level of the upper margin of the antennal sockets; at the sides it extends upwards as a narrow curved projection reaching the same level, receding from the orbital margin rather slowly, with its concave side following the margin of the antennal socket. Vertex closely and roughly punctured. Antennae wholly dark, their tips reaching only a little beyond the tegulae; scape moderately swollen. Prothorax all dark except the usual light spot on tubercles, which exhibits no dark dot. Tegulae with a light spot. Mesothorax moderately shining, very closely punctured, scutellum not so closely. Enclosed portion of metathorax coarsely rugose. Pleura closely punctured. Wings strongly tinged with fuliginous, nervures and stigma piceous. Second submarginal cell not narrowed one-half to marginal. Femora black, with a small yellow spot at extreme end; anterior tibiae light in front, middle tibiae

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THE MALLOPHAGA.

BY VERNON L. KELLOGG, STANFORD UNIVERSITY, CAL.

A small and interesting group of insects, the Mallophaga, seems to have been pretty methodically and consistently overlooked by American insect-students. In Germany, Nitzsch of the University of Halle, and following him and profiting by the collections and notes made by him, Giebel and Taschenberg, at Leyden Piaget, and in England Denny, have undertaken to collect and describe Mallophaga, with the result that some 1000 species have been named, and several very portly volumes filled with descriptions and figures of these small parasitic insects have been printed. The Mallophaga are interesting because of their parasitic habits, their strangely specialized structure, and the still open question of their position among insects. Because they have been commonly associated with the Pediculidae in early entomological texts, and have been studied by Nitzsch, Giebel, Denny and Piaget with the true lice as external parasites of warm-blooded animals, and are called "lice," and are unknown things to most entomologists, they are commonly held as a group closely allied to the Pediculidae, which they most certainly are not.

They have an incomplete metamorphosis, biting mouth parts, are wingless, and feed on the scales, feathers and

hairs of mammals and birds. They have gradually ascended during the storm and stress of classificatory struggling from the position of a family blown with each changing wind from Hemiptera to Orthoptera to Pseudo-Neuroptera, to the position of an independent order untrammelled by near relations or affinities.

With some considerable difficulty I have made a small beginning in the study of the American forms, and have now in the course of printing the descriptions and figures of one new genus and 38 new species of Mallophaga collected by me from American water and shore birds, mostly maritime birds shot on the Bay of Monterey, California. On these water birds I have besides identified 23 species previously described from European birds. In addition I have noted on American land birds 16 previously described species and 24 new forms. No recognizable species of Mallophaga has been heretofore described from specimens taken from American birds. In this short study of the group, there are apparent many interesting problems in zoological and geographical distribution, in the relation of parasite to host, and in the peculiar opportunities for variation and species-forming.

Because of these interesting problems and of the need for a wider observation of the American forms of the group I present this table of the genera of the Mallophaga and a short paper to follow on their habits and distribution in the hope of calling the attention of American students to the group.

The Mallophaga were divided by Nitzsch into two families, the Philopteridae with filiform antennae and without maxillary (= labial) palpi, and the Liotheidae with capitate, 4-segmented antennae and maxillary (= labial) palpi. The family Philopteridae included two genera: *Trichodectes*, with 3-segmented antennae and 1-clawed tarsi, and *Philopterus* with 5-segmented antennae and 2-clawed tarsi. The latter genus was subdivided into the five sub-genera *Docophorus*, *Nirmus*, *Goniocotes*, *Goniodes*, and *Lipeurus*. The family Liotheidae similarly included two genera: *Gyropus* with 1-clawed tarsi and *Liotheum* with 2-clawed tarsi. The latter genus was subdivided into six sub-genera.—*Eureum*, *Laemobothrium*, *Physostomum*, *Trinoton*, *Colpocephalum* and *Menopon*. The two 1-clawed genera *Trichodectes* and *Gyropus* (one belonging to each family) were found by Nitzsch exclusively upon mammals; all the other genera exclusively upon birds. In essential identity the classification of to-day is that of Nitzsch; it differs in discarding the generic groups *Philopterus* and *Liotheum*, and in considering the Nitzschian sub-genera as genera, and in the addition

of several new genera based on species since discovered.

The change of classification by which the one-time sub-genera of *Philopterus* are now put on equality with the genus *Trichodectes* and similarly the sub-genera of *Liotheum* on equality with *Gyropus*, seems to me ill-advised. The two genera found on mammals differ in so many ways and so radically from their bird-infesting congeners (?) in each family that I believe their striking host and structural differences should be recognized in the classification. I propose, therefore, in the light of the present ranking of the Mallophaga as an independent order of insects, to rank the Nitzschian families as sub-orders, the Nitzschian genera as families, and the Nitzschian sub-genera, the genera of present-day writers, as genera. This will leave unchanged the present generic names and ranking, but will restore the expression, first indicated by Nitzsch in his generic groups, of the differences between the mammalian parasites and the avian parasites. This re-ranking, which is practically a return to the classification of Nitzsch, is adopted in the following synopsis and key which I have arranged to include all the genera so far established.

Synopsis of the Order Mallophaga.

Sub-order ISCHINOCERA.

Family *Trichodectidae*.

Genus *Trichodectes* Nitzsch.